Revisions of Ceylon Fungi.

(PART III.)

BY

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IN Part I. of this series (Ann. Perad., IV., pp. 21–68) it was stated that the specimens which Gardner sent to Berkeley were now in the Herbarium of the British Museum. That statement was based on information furnished in Ceylon, and has since been found to be incorrect. Gardner's specimens were apparently retained by Berkeley, and are now in the Kew Herbarium, while the paintings which accompanied that consignment are in the Kew Library. These paintings are contained in a small octavo volume, and consequently are much reduced; they are for the most part more or less impressionist, and in many cases it is impossible to decide from the figure whether the fungus represented is an agaric or not. Figure 51, which was reproduced by Berkeley in Hooker's London Journal of Botany, is missing. The specimens are all available, and in the majority of cases it would be possible to determine what the fungi are, but except in the case of new species it is scarcely worth while. A large number were assigned to European species; the correction of these identifications would serve no useful purpose, and would certainly not provide information commensurate with the time and labour involved.

The Kew Herbarium contains the majority of the specimens forwarded to Berkeley by Thwaites, while many duplicates and some types are to be found in the Broome collection at the British Museum. The distribution of types (or co-types) appears to have been decidedly irregular; most of them are at Kew, with duplicates at the British Museum. But the latter herbarium contains some species which are not represented at Kew, and others are at Peradeniya only.

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It may be noted that the herbarium specimens show that when Berkeley and Broome cited two Thwaites' numbers, such as "(Nos. 5 and 1094 in part)," they did not mean that Thwaites sent two collections, but that 1094 is part of Thwaites' 5, separated, apparently, by Berkeley.

The British Museum Herbarium contains also the Ceylon specimens which were collected by König and described by Berkeley in "Notices of Fungi in the Herbarium of the British Museum," Ann. Nat. Hist., Vol. X. (1842), pp. 369–384. In his early lists, Berkeley makes frequent reference to "Fl. Zeyl.," and these references have caused some confusion. Mycologists who have wished to verify them have consulted Linnæus, Flora Zeylanica (1747), only to find that there are no descriptions of fungi in that work. For example, Fries writes: "Accepi nomine *Boleti lactei* Linn., Fl. Zeyl., sed in opere citato non reperi." An examination of his specimens shows that König assigned a name to each species he collected; and that Berkeley, in citing Fl. Zeyl., referred merely to the (unpublished) names on the herbarium sheets.

71.—Lepiota continua Berk.

Agaricus (*Lepiota*) *continuus* Berk., Lond. Jour. Bot., VI., p. 480.

Agaricus (*Lepiota*) *oncopus* B. & Br., Jour. Linn. Soc., XI., p. 496.

When Berkeley and Broome described *Lepiota oncopoda*, they suggested that it might be identical with *Lepiota continua*, previously described by Berkeley. From the type specimen (Gardner 29) and the figure sent by Gardner, that view appears to be correct, though all the warts have been rubbed off the pileus. The species will therefore be known as *Lepiota continua*. For re-description see Annals of Peradeniya, IV., p. 47.

72.—Lepiota albuminosa Berk.

This species was No. 51 of Gardner's collection, and was described by Berkeley in Lond. Jour. Bot., VI., p. 482, with a figure, tab. XX., fig. 3. On consulting Gardner's book of paintings at Kew, it is found that there is no figure 51: it may

have been removed for the purpose of reproduction, but as the other figures which were reproduced were not removed, that seems hardly probable. Berkeley's figure shows an agaric, apparently with a viscid cuticle which extends in shreds beyond the margin : the stalk is thickened below and black at the base, where it is truncate, as though it had been cut short. Berkeley's description states that the pileus is covered with a glutinous veil and has an appendiculate margin ; and that the stalk is rooting and transversely squamulose with fragments of the ruptured veil.

In the herbarium Gardner No. 51 is included with Gardner No. 29 under *Lepiota continua*. But 29 bears the inscription *Lepiota continuus* Nov. sp., written by Berkeley on Gardner's label, while No. 51 has *Agaricus continuus* Berk. attached to the sheet on a separate label, though in Berkeley's handwriting. Apparently there has been some error in the labelling of No. 51. The two specimens in 51 have glabrous pilei, and to judge from the grains of sand adhering to them they were viscid when moist ; their stalks are suddenly strongly inflated below. But apparently neither of these specimens furnished the figure reproduced by Berkeley. It would seem that the name *Agaricus continuus* has been attached to these specimens at a later date, because they had inflated bases like those of the latter species.

The only Ceylon agaric at present known which in any way resembles the figure and specimens, is the species which grows from termite nests. The latter has a rooting stalk which is black below the ground level, and a cartilaginous cuticle, viscid in wet weather, which sometimes extends in shreds over the margin. The inflated base occurs in the form which was named *Collybia sparsibarbis*. This adds another name to the already lengthy list of synonyms which refer to that species, and as it is prior to *Armillaria eurhiza* Berk. it necessitates another change of name. In " The Fungi of certain Termite Nests " I referred this species to *Volvaria*, as it has pink spores, a universal veil, and an adherent volva ; but Prof. F. von Höhnel considers that it should be regarded as a rosy-spored *Collybia*. In general appearance it is certainly a *Collybia* in most of its forms, and, as we have little information

concerning the presence or absence of a universal veil in the majority of agarics, I am not disposed to dissent from von Höhnel's correction. The nomenclature will therefore stand as follows:—

Collybia albuminosa (Berk.) Petch.
= *Lepiota albuminosa* Berk.
= *Armillaria eurhiza* Berk.
= *Lentinus cartilagineus* Berk.
= *Armillaria termitigena* Berk.
= *Collybia sparsibarbis* B. & Br.
= *Agaricus* (*Pluteus*) *Rajap* Holtermann.
= *Flammula Janseana* P. Henn. et E. Nym.
= *Pholiota Janseana* P. Henn. et E. Nym.
= *Flammula filipendula* P. Henn. et E. Nym.
= *Pluteus Treubianus* P. Henn. et E. Nym.
= *Pluteus bogoriensis* P. Henn. et E. Nym.
= *Pluteus termitum* P. Henn.
= *Collybia radicata* Pat. non Relh.
= *Tricholoma subgambosum* Cesati.
= *Volvaria eurhiza* (B. & Br.) Petch.
= *Collybia eurhiza* (B. & Br.) v. Höhnel.

73.—Tricholoma crassum Berk.

Agaricus (*Tricholoma*) *crassum* Berk., Lond. Jour. Bot., VI., p. 483.

Agaricus (*Tricholoma*) *pachymeres* B. & Br., Jour. Linn. Soc., XI., p. 515.

Pileus convex, sometimes slightly depressed in the centre, occasionally obtusely umbonate, margin incurved and often sinuate, grayish brown or dark brown in the centre, becoming pale ochraceous towards the margin, hoary with a fine whitish tomentum, in dry weather minutely areolated and cracking radially, often guttate, up to 14 cm. diameter. Flesh white, up to 2 cms. thick in the centre.

Stalk up to 18 cm. high, usually strongly inflated at the base and attenuated upwards, but sometimes swollen in the middle and attenuated above and below: base 2·5 to 5·5 cm. diameter, apex 1·5–4 cm.; rough: solid; white with brownish

streaks, or with the outer layer split into small upwardly-directed, dark gray, fibrillose scales ; base white and slightly tomentose.

Gills narrow, crowded, pallid, strongly attenuated outwards, sinuato-adnexed ; edge usually irregular.

Spores white, oval or subglobose, 5–6 × 3–4 μ.

On the ground among grass, sometimes in a ring : often connate. Peradeniya, 28·8·06 ; 9·9·07 ; 15·8·10, &c.

74.—Armillaria dasypepla Berk.

Agaricus (*Armillaria*) *dasypeplus* Berk., Hooker's London Journal of Botany, VI., p. 482.

Agaricus (*Lepiota*) *dasypeplus* Berk., Journ. Linn. Soc., XI., p. 506.

Pholiota dasypepla (Berk.) Cooke. Saccardo, Sylloge Fungorum, IX., p. 93.

This species was sent to Berkeley by Gardner, and was described as follows :—

"Cæspitosa ; pileo e convexo-expanso demum depresso sinuatoque tomentoso squamuloso fulvo : stipite subæquali annuloque fugaci tomentoso fulvis ; lamellis incarnatis purpurascentibus, postice sinuatis, dente affixis.

"On dead wood, Hantane, Ceylon. Pileus 4 cms. latus, densa lanugine obtectus, hic illic squamulosus ; stipes 2·5 cm. longus, 4–6 mm. crassus. Affinis *A. melleæ* sed bene distincta ob naturam lanuginis, annulum fugacem atque lamellas nitentes."

In Saccardo, Sylloge Fungorum, IX., p. 93, Cooke states that the spores are pale brown, 10–11 × 8 μ, and therefore transfers it to *Pholiota*.

Gardner's painting shows an infundibuliform fungus, clustered, yellow-brown dotted with red-brown, margin at first strongly inrolled, gills violet. The type specimens are much damaged and eaten by insects ; the damage most probably occurred when they were in process of drying, and, if so, the description was based on the figure only. The annulus referred to by Berkeley is apparently the termination of the tomentum on the stem.

From the texture of the fragments now available, the fungus appears to be a *Lentinus*. The colour agrees with that view, since there are several Ceylon *Lentini* which are at first violet, but become brown when mature, *e.g.*, *L. Lecomtei*, *L. similis*, *L. estriatus*, &c. The stalks are too long for *L. Lecomtei* and the pileus is not sulcate as in *L. similis*. But the abundant spores in the herbarium specimens are pale brown, 4–8 × 3–5 μ, and hence its reference to *Lentinus* is excluded.

It is curious that Berkeley should have referred this species to *Armillaria* and *Lepiota*, seeing that the gills are coloured, and that there is an abundance of brown spores. Can it be that continual poisoning has changed the colour of the spores ? At present, the question of its exact position must be left open until fresh specimens have been gathered.

75.—Clitocybe scotodes (B. & Br.) Petch.

A. (*Collybia*) *scotodes* B. & Br., Jour. Linn. Soc., XI., p. 522.

Pileus up to 3 cm. diameter, broadly convex, grayish brown in the centre, dark gray elsewhere, extreme margin almost white, minutely radially rugose, hygrophanous. Flesh thin, dark when moist.

Stalk about 3 cm. long, 4 mm. diameter, stuffed then hollow, densely covered with minute white particles, equal, brittle. Gills white, adnate, abruptly narrowed behind, ventricose, edge irregular.

Spores white, 4–5 × 3 μ, oval, smooth.

On the ground in shrubberies, Peradeniya ; smells strongly of new meal.

76.—Collybia omotricha Berk.

This species was originally described from South Africa in Hooker's London Journal of Botany, Vol. II., p. 410, and was subsequently enumerated among the fungi sent by Gardner from Ceylon.

Gardner's figure is scarcely recognizable ; from the colour of the gills his fungus was apparently a small *Psalliota*. Thwaites did not collect it, and there is no Ceylon specimen at Kew. Under the circumstances, the record must be considered doubtful, and the name *Collybia omotricha* should be deleted from the Ceylon list.

77.—Pluteus chrysægis (B. & Br.) Petch.

A. (*Entoloma*) *chrysœgis* B. & Br., Jour. Linn. Soc., XI., p. 536.

Pileus 2·5–4 cm. diameter, broadly convex, golden yellow, fuscous in the centre, becoming brown when old, glabrous, margin striate, feebly sulcate when old, edge pale; flesh thin, white, becoming yellow.

Stalk up to 3·5 cm. long, 2–3 mm. diameter, slightly attenuated upwards, white, becoming yellowish at the base, longitudinally striate, sometimes twisted, powdered below, glabrous above, solid.

Gills free, crowded, rounded behind, up to 4 mm. broad, white, then pink, equal. Spores salmon in mass, globose, smooth, 4–6 μ diameter.

On rotting stumps, Peradeniya.

78.—Naucoria micropyramis (B. & Br.) Massee.

Agaricus (*Hebeloma*) *micropyramis* B. & Br., Jour. Linn. Soc., XI., p. 540.

Inocybe micropyramis (B. & Br.) Cooke, Grevillea, XIX., p. 104.

Naucoria micropyramis (B. & Br.) Massee, Annals of Botany, XVIII., p. 501.

Pileus at first conical, sometimes obtusely campanulate, then almost plane, acutely or obtusely umbonate, dark brown, up to 3·5 cm. diameter, centre covered with dark brown conical warts, cuticle elsewhere split into dark brown, rather rigid, recurved scales; margin at first incurved, fimbriate; flesh white, becoming purplish when cut.

Stalk up to 3·5 cm. high, 3 mm. diameter, equal, dark brown, with fine white longitudinal striæ, clothed with brown fibrils on the lower two-thirds, base whitish, almost solid.

Gills brown, edge white and serrate, adnexed, ventricose; no cystidia. Spores pale brown, oblong-oval, 8–10 × 5 μ.

On the ground among grass: often clustered. Peradeniya.

79.—Æruginospora singularis v. Höhnel.

An agaric which answers in many respects to von Höhnel's description of this species has been observed on several occasions at Peradeniya, but has not hitherto been recorded because it could not be determined whether it had been previously described, as would be expected, by Berkeley and Broome. It grows among short grass in the open, usually solitary. The pileus is about 5 cms. in diameter, almost plane, margin slightly incurved, ashy, with a pink tinge in the centre, becoming tinged with green when old, with innate radiating fibrils, sometimes slightly scurfy, but generally smooth, dull, not shining; flesh of the pileus white, thin except over the stalk. Stalk straight or curved, white, expanding upwards into the pileus, up to 6 cm. high, 6 mm. diameter in the middle, attenuated below, slightly longitudinally fibrillose, solid, white, and fibrous internally. Gills pale green, thick, edge obtuse, decurrent or adnato-decurrent, margin entire, of three lengths, broad (4 mm.), brittle, attenuated outwards, sometimes ventricose, ridged and veined above. Spores white, globose, 4–6 μ diameter.

The substance of the stalk and pileus is somewhat dry. The whole fungus has a most peculiar, almost an artificial, appearance, as though the turbinate stalk and pileus had been carved out of white wood, and the thick green gills stuck on in the curve.

The above appears to correspond closely with v. Höhnel's description, and his specimen in the Kew Herbarium. But the spores are not green, "hell spangrun, fast himmel-blau," but white, and the gills are permanently green, not at first white and then becoming green from the spores. I was unable to obtain any but mould spores (? *Sterigmatocystis*) from the specimen in the Kew Herbarium.

80.—Marasmius tortipes B. & C.

This was described by Berkeley, Journ. Linn. Soc., X., p. 298, from a gathering made by Wright in Cuba. Subsequently it was recorded by Berkeley and Broome from Peradeniya, Thwaites' collection number being 156. There is no specimen in the Broome collection at the British Museum,

and the type, ex. Herb. Berkeley, at Kew contains only one specimen, which is marked Wright (Curtis) No. 156. Thus there is only one (type) specimen in existence, and as the collection number of that is identical with that attributed to the missing Ceylon specimens, it would seem that the species has been included in the Ceylon list in error.

81.—Lentinus radicans B. & Br.

The type specimen at Kew is identical with *Lentinus giganteus* Berk. (see Ann. Perad., IV., pp. 406–408).

When Berkeley described *Lentinus stenophyllus* (= *L. giganteus*) he stated that it was identical with *Peziza Zeylonica* Houttuyn, in Linn., Pflanzensyst, Vol. 13, p. 51, tab. 105, f. 4. That species is not cited in Edition 13, J. F. Gmelin, 1788; but in a Dutch version published in Amsterdam, 1783, entitled "Handleiding tot de Plant- en Kruidkunde, benevens eene uitvœrige Beschrijving der Boomen," &c., Vol. XIV., p. 655, there is a description of *Peziza ceylonsche* as follows:—

"Hier zal die fraaije *Ceylonsche* behooren, welke de Edele Heer Chr. P. Meijer, keurig Verzamelaar van uitgezogte Naturaliën, onlangs uit Oostindie, onder verscheide andere Zwammen ontvangen, en mij ter Afbeelding gunstig medegedeeld heeft; zie Fig. 4 op Plaat CV. Want, schoon dezelve geenszins vliezig is, maar eene vaste zelfstandigheid heeft, toont de Gestalte genoegzaam, dat zij hier t' huis te brengen zij en de volgende, die beiden gesteeld zijn in dit Geslagt. Dat zij troopswijze groeijen blijkt aan den Voet; de Gestalte uit de Afbeelding, zo wel als de dikte van den Rand, die stomp is en rond eenigermaate uitgehoekt of als ingefneeden. De hoogte is omtrente vier Rynlandsche Duimen boven het Voetstuk, dat voor Wortel schijnt te vertrekken. Zij heeft den Steel of Stam, tot omtrent een Duim beneden den Rand, zeer glad zwartachtig bruin, even als of zij gevernist ware, en zodanig is ook de binnenhalt, meer dan een Duim diep, voor een groote gedeelte. In 't overige heeft der geheele Top eene geelachtig witte Kleur en is van onderen vol uitermaate, kleine, naauwlijks met het bloote oog zigtbaare Gaatijes; welke haar veeleer tot de *Boleti* zouden betrekken, indien niet de Trechter- of Trompetachtige Gestalte haar hier t' huis bragt."

From the figure, "*Peziza ceylonische*" would appear to be a half-expanded *Lentinus giganteus*, as Berkeley supposed, though there is nothing very characteristic about it. But it is quite evident that the description does not refer to a *Lentinus*, but rather to a *Polystictus*, most probably *Polystictus xanthopus*.

82.—Lentinus badius Berk.

This species was originally described by Berkeley under the name *Panus badius* from specimens collected by Cuming in the Philippines. Subsequently Berkeley received specimens from Ceylon, sent by Gardner (No. 59), which he assigned to the same species, and changed the name to *Lentinus badius*.

Thwaites sent the same Ceylon species to Berkeley and Broome, in numbers 94 and 686. These were named *L. blepharodes* (94 and 686) and *L. similis* (686, cum icone); the latter was listed in the "Fungi of Ceylon" as "*C. similis*," evidently a printer's error. There was some confusion with regard to the figure. Thwaites sent two figures, both numbered 686; one of these is the brown species under consideration, while the other is a white species altogether different.

Considering first of all the figures, we find that though Berkeley and Broome cite *L. similis* as "686, cum icone," they labelled the original drawing of the brown species *L. blepharodes*, while that of the white species was not named. The copies in the Kew Library were dealt with in the same way, but some one has subsequently detected the confusion, and has labelled the brown species *L. similis*, and the white species *L. blepharodes*, which it is not.

In the Kew Herbarium, under *Lentinus badius*, there are the original specimens from the Philippines, and four Ceylon specimens from the Hookerian Herbarium; the latter are numbered No. 69, which is probably an error for Gardner's 59, since 69 is a *Polyporus* in Gardner's numbers and a *Platygrapha* in Thwaites'. These two gatherings are quite different in stature, gills, stalk, and apparently in texture also. The same is true of the corresponding specimens in the British Museum Herbarium.

Under *Lentinus similis* at Kew are Thwaites 686 together with Gardner 59. The latter was first labelled *badius* by Berkeley, but subsequently changed by him to *similis* B. & Br. Hence it appears that Berkeley discovered that his *Panus badius* from the Philippines was not the same as *Lentinus badius* from Ceylon, and altered the name on his herbarium specimens, but those in the Hookerian Herbarium retained the name under which they had been distributed.

Under *Lentinus blepharodes* at Kew, one Ceylon sheet bearing two specimens is labelled "*Lentinus blepharodes* (B. & Br.) B. & C., *Lentinus similis* B. & Br., Ceylon, G. H. K. T."; another is marked "94 *Lentinus blepharodes* B. & C., Peradeniya, G. H. K. T., Nov., 1867;" while a third collection, consisting of two almost glabrous specimens, is labelled "*Lentinus blepharodes* B. & C. 686. *Lentinus similis* B. & Br., Var., Central Province, Ceylon." All these are identical with the Ceylon specimens under *Lentinus similis* and *Lentinus badius*.

Our Ceylon species is certainly not *L. badius*. According to the herbarium specimens it is not *L. blepharodes*, since the latter has a velutinate stem, while the stem of the Ceylon species bears a spongy coating. *L. blepharodes* appears to be restricted to the Western hemisphere, but there is a specimen in Herb. Kew, with a velutinate stem, from the Nilghiris. As far as the three names considered are concerned, the Ceylon species must be known as *L. similis*, and the records of the other two species for Ceylon discarded.

Lentinus similis is entirely amethyst or violet when young, becoming pale brown to red-brown when old. The pileus is up to 8 cm. in diameter, deeply infundibuliform, edge decurved or plane, regularly plicatosulcate to the centre, coarsely velvety with short close-set hairs which are often grouped into tufts within the tube, margin regular and fimbriate. Total height up to 14 cms. Stalk usually straight, tough, solid, white internally, equal, expanded at the base, where it sometimes arises from a dense tuft of hyphæ, clothed with long silky hyphæ entangled in a spongy mass. Gills decurrent, their lower ends hidden in the covering of the stem, narrow, rather crowded, edge entire; the gills change from violet to cream-coloured, and finally become brown. Spores white,

narrow-oval or oblong-oval, 5–7 × 3–3·5 μ. On dead wood, scattered or fasciculate. The whole fungus is tough and elastic when fresh, but become somewhat brittle when dry. It frequently arises from peculiar pseudosclerotia, of which it is hoped to publish a description shortly.

83.—**Hydnum gilvum** Berk.

Berkeley and Broome described this species (Jour. Linn. Soc., XIV., p. 59) as "Pileo flabelliformi ochraceo pilis cartilagineis radiantibus vestito; contextu fibroso spongioso, aculeis acutis. Pileus 3 inches across, 2¼ long, flabelliform, clothed with radiating cartilaginous hairs; substance spongy, mixed with cartilaginous bodies like those with which the pileus is clothed; prickles 2 inches long; spores ·0005–·0006 long, with a strong nucleus ·0002–·0003 wide. Intermediate between *Hydnum* and *Hydnoglœa*." That description was compiled from the Ceylon specimens sent by Thwaites; but the species had been previously described by Berkeley, in Hooker's Journal of Botany, III. (1851), p. 168, as follows:—"Imbricatum tenue subcarnosum; pileo flabelliformi pallide gilvo postice virgato antice strigoso; aculeis tenuibus subulatis teretibus integris fuscescentibus. On dead trunks, Darjeeling. Imbricated. Pileus 2 to 3 inches long, flabelliform, sometimes laterally connate, thin but fleshy, pale reddish gray, attenuated behind, strigose at the base, disc more or less virgate, rarely rough, margin strigoso-cirrhate, acute. Hymenium yellowish-brown, at length dark; aculei elongated, subulate, entire, margin generally sterile."

Whether the Ceylon species is identical with that from India would appear doubtful. A specimen recently gathered at Peradeniya grew in a rubbish heap, where it formed a labyrinthine mass about 2 feet in diameter, encrusting the dead stems, leaves, &c. The part buried in the rubbish formed a pseudostalk which developed a hymenium, or produced lateral pilei, wherever it was exposed. The pilei are orbicular or flabelliform, 2 to 3 inches across, imbricated, and usually fused laterally into sheets 6 inches or more in length. The whole fungus is pure white when fresh, the hymenium becoming brown where bruised; its

substance is soft, spongy, and fibrillose, up to 1 cm. thick. The pilei are minutely tomentose, sometimes smooth, but usually clothed with radiating innate fascicles of coarse fibrils. The margin is usually thick when fresh. The aculei are conical, terete, entire, and up to 8 mm. long.

In drying, the pilei become much thinner, and the appearance of the fungus alters considerably. In some places the margins of the pilei become quite thin and cartilaginous when dry, sometimes for a breadth of more than a centimetre, though there is no sign of that when the fungus is fresh. Such cartilaginous margins are sterile below, or bear aculei in early stage of development. At first sight it would appear that the pilei possess an inner cartilaginous layer which develops more rapidly than either the hymenial layer or the upper layers of the pileus, but sections do not uphold that supposition, for the cartilaginous margin is continuous with normal hyphæ behind. Coarse cartilaginous strands do, however, occur in the white flesh, especially running longitudinally in the pseudostalk, and Berkeley and Broome noted that the substance of the fungus is " mixed with cartilaginous bodies like those with which the pileus is clothed." As the herbarium specimens bear strong radiating innate fascicles of coarse fibrils, it must be supposed that the " bodies " referred to were cartilaginous strands. This development of a margin which becomes cartilaginous when dry, or of cartilaginous hairs on the pileus, is not dependent upon the age of the pileus, *i.e.*, it is not necessarily a normal feature of young pilei : one young specimen recently gathered, in which the pilei do not exceed one centimetre in breadth, has a white swollen margin when dry, and no evidence of any cartilaginous structure in any part. The development of that particular feature would appear to depend rather upon the weather conditions prevailing at the time of growth.

Neither on the specimens in the Peradeniya Herbarium nor on those recently collected do the aculei exceed one centimetre in length ; it would appear therefore that Berkeley and Broome's measurement is a mistake, as far as the Ceylon species is concerned. The fungus bears no resemblance whatever to *Hydnoglœa* (*Tremellodon*) when fresh.

84.—Hydnum scariosum B. & Br.

Hydnum scariosum B. & Br. in herb., Cooke (?), Grevillea, XX., p. 2.

Examination of the type specimen at Kew shows that this is identical with *Heterochæte tenuicula* (Lev.) Pat. This is a common species in Ceylon, but it was not included in Berkeley and Broome's list. It was hard to understand how Thwaites managed not to collect it, but the difficulty has now been removed.

85.—Corticium salmonicolor B. & Br.

Corticium salmonicolor B. & Br., Jour. Linn. Soc., XIV. p. 71.

Corticium javanicum Zimm., Centralb. f. Bakt., VII., p. 103, non Sacc. et Syd., Sylloge Fungorum, XVI., p. 189.

Corticium Zimmermanni Sacc. et Syd., Sylloge Fungorum, XVI., p. 1117.

Examination of the type specimen at Kew has shown that *C. salmonicolor* is identical with the well-known parasitic species, hitherto recorded in the East as *Corticium javanicum* Zimm. Massee's re-description of *Corticium salmonicolor* in Mon. Thelephoreæ (Jour. Linn. Soc., XXVII., p. 122) does not refer to the type.

86.—Cyphella versicolor B. & Br.

Cyphella versicolor B. & Br., Jour. Linn. Soc., XIV., p. 73.

Cyphella pruinosa B. & Br., Jour. Linn. Soc., XIV., p. 74.

Gregarious, in patches covering several square centimetres sometimes on a thin, dark brown or tawny, tomentose stroma with a whitish edge, sometimes on the substratum without any stroma; especially without a stroma when growing in lines through cracks in the bark.

Cup-shaped, margin at first incurved, up to 1 mm. diameter and 0·75 mm. high, narrowed below into a short stem-like base, 0·25 mm. diameter, membranous, disc pale brown, externally tawny at first, then white; clothed externally with short, irregular, brown or hyaline hairs, 25–60 μ long, 4–8 μ diameter, which are roughened with lime deposits especially

towards the apex ; the exterior appears granular or pruinose under a low magnification. When old, the substance of the cups contains numerous cubic crystals, up to 15 μ broad. The larger specimens are laterally compressed when dry. Spores smooth, ellipsoid, pale brown to yellow-brown, 8–10 × 5–7 μ, often with a large gutta.

Common on dead branches, *e.g.*, cacao. *Versicolor* is the form with a stroma, *pruinosa* the form without.

87.—**Exobasidium cinnamomi** Petch.

This species was described in Ann. Perad., Vol. IV., p. 301 (March, 1909). It occurs on *Cinnamomum zeylanicum* Bl. and *Cinnamomum cassia* Bl. In a paper by J. S. Gamble " On the determination of the fungi which attack forest trees in India " (Indian Forester, *circa* 1900), I find a reference to *Exobasidium Cinnamomi* Mass., on *Cinnamomum Tamala*, which is said to have been recorded previously in Indian Forester, XXI., p. 133. I am unable at present to consult that volume of the Indian Forester, but it would appear from Gamble's statement that the description of the fungus had not been published when he wrote. As there is no record of Massee's species in Saccardo, it would seem probable that the description has not been published.

88.—**Physarum chlorinum** Cooke.

Examination of the type specimen at Kew shows that this is identical with *Melanconium melanoxanthum* B. & Br. = *Endocalyx melanoxanthus* (B. & Br.) Petch. Cooke's name was published in Grevillea, V., p. 101 (March, 1877), Berkeley and Broome's in Jour. Linn. Soc., XIV., p. 89 (Dec., 1873).

89.—**Reticularia apiospora** B. & Br.

Reticularia apiospora B. & Br., Jour. Linn. Soc., XIV., p. 82.

Trichosporium apiosporum (B. & Br.) Massee, Jour. Myc., 1889, p. 186.

This species was described by Berkeley and Broome as follows :—" Effusa, dendritica, fulva ; peridio fibroso-sericeo ; sporis obovatis, basi breviter auctis hyalinis (No. 266).

Resembling, when young. *Hymenochæte dendritica* : spreading widely : peridium consisting of branched silky fibrils ; spores ·0003 long, ·00015 wide." Subsequently it was re-described by Massee as "*Trichosporium apiosporum* : Late effusum fulvum ; hyphis agglutinatis in fasciculos dendritice radiantes ; conidiis ex apice subpyriformi ramulorum oriundis, ellipsoideis, minute verrucosis, subhyalinis, 8–9 × 5 μ." In Lister's Monograph it was excluded from the Mycetozoa, but an examination of the specimen in the Peradeniya Herbarium threw no light upon its real nature. The specimen consists of a block of red-brown hyphæ, in which are mingled a few hyaline spores and a large number of echinulate, obovate spores, which, as stated in "The Mycetozoa of Ceylon," look exactly like the spores of *Fomes lucidus*, or rather the Ceylon species which has been supposed to be *lucidus*.

A search through Berkeley and Broome's List of the Fungi of Ceylon reveals the fact that Thwaites' 266 provided not only *Reticularia apiospora*, but also *Hymenochæte dendroidea* B. & Br. and *Hypomyces chrysostomus* B. & Br. The latter was said to be parasitic on a brown feathery mycelium. The reference to *Hymenochæte dendritica*, in the description quoted above, is an error for *dendroidea* : this species was transferred to *Thelephora* by Cooke (Grevillea, VIII., p. 150).

Thelephora dendroidea has recently been collected again in Ceylon, and its re-discovery has solved the problem of the identity of *Reticularia apiospora*.

Thelephora dendroidea usually grows on the under surface of *Fomes australis*, sometimes spreading to and surrounding grasses, &c., in the neighbourhood. In its mode of growth it resembles a *Thelephora*, but as spores and basidia have never been observed, its true position is unknown. Mr. C. G. Lloyd informs me that it occurs in America, usually on *Fomes applanatus* (which is the temperate form of *australis*), and that it is equally sterile there. It is generally orbicular, and centrally attached, but it becomes adherent to the lower surface of the *Fomes*, so that it might be described as loosely adherent. On grasses it encircles the stalk, or runs along projecting from one side. Its upper surface is continuous and usually somewhat nodular, the latter character

probably depending upon inequalities in the under surface of the *Fomes*. Its substance is soft and loose, being built up of radiating, fern-like, superposed strands of mycelium, entirely red-brown. The lower surface is beautifully adorned with repeatedly-pinnate veins radiating from a common centre, like the fronds of a large *Hypnum :* to this feature the fungus owes its name.

In Berkeley and Broome's specimens, and in those recently collected, the whole of the tissue of the fungus is crowded with spores; but these are not the spores of the *Thelephora*, but the spores of the *Fomes*, which have fallen while the *Thelephora* was growing and have been entangled in the loose tissue. Further, both the recent specimens and those which Thwaites gathered are parasitized by *Hypomyces chrysostomus*.

When Berkeley and Broome received Thwaites 266, they separated part of it as the type of *Thelephora dendroidea*, and part as the type of *Hypomyces chrysostomus*. But a third part they named *Reticularia apiospora*. The latter is part of the thallus of the *Thelephora*, containing the spores of *Fomes australis* and the conidia of *Hypomyces chrysostomus*. Massee's measurement is that of the spores of the *Fomes*, but they are not subhyaline.

90.—Eurotium diplocystis B. & Br.

This was described by Berkeley and Broome (Jour. Linn. Soc., XIV., p. 137) as follows:—" Irregulare, subglobosum vel elongatum, flavum, demum aurantiacum; ascis globosis pedunculatis e floccis decumbentibus oriundis; sporidiis octonis ellipticis (No. 291). The ascus itself is soon absorbed as in the genus *Badhamia ;* the peduncle is long and flexuous, several arising from decumbent branched threads. This may possibly be a distinct genus; but we have scarcely sufficient materials to decide."

The supposed co-type of this species (Thwaites 291) in the Peradeniya Herbarium contains only a sterile sclerotium resembling that which I have previously referred (in error) to *Sclerocystis coremioides*. As it seemed impossible that species should have furnished the description quoted above, the

identity of *Eurotium diplocystis* was left in abeyance until the Kew specimens had been examined. Recently, however, a gathering of the *Sclerotium* made at Peradeniya was found to contain another species as well, which might be *Eurotium diplocystis*, from which it appeared probable that the same thing might have occurred when Thwaites collected the latter species. Examination of the type specimens of *Eurotium diplocystis* at Kew has confirmed this supposition ; at least six of the nine specimens agree with the species recently collected in company with the *Sclerotium*. This species is *Onygenopsis Engleriana* P. Henn.

The type specimen at Kew is labelled *Diplocystis flava* B. & Br., while the cover is labelled (*Eurotium*) *flavum*. Apparently neither of these names was published. The description evidently refers to the *Onygenopsis*, not to the specimens which were returned to Peradeniya.

As *Onygenopsis Engleriana* has only been described from dried specimens, the following notes may be of use. This species grows on dead leaves or twigs to which the fructification is attached by a white basal weft of hyphæ. It is sessile, hemispherical or subglobose, 2–6 mm. in diameter, sometimes pulvinate, elongated, up to 6 × 3 mm., rough, white or yellowish, becoming ochraceous in drying. It consists of a central core of interwoven hyphæ which form a loose pseudo-parenchymatous tissue, surrounded by an outer zone of asci with a few hyphæ intermingled. The asci are borne singly, the ends of branching hyphæ ; they are oval, 30 × 45 μ, or globose, 30 × 45 μ diameter ; most of them are sixteen-spored, but some are eight-spored ; the spores are smooth, hyaline, internally granular, oval or globose, 13–21 × 10–19 μ. There is scarcely any peridium ; here and there a few hyphæ overrun the mass of asci. The whole fructification appears rough when magnified, because the individual asci are then evident. The name will now stand as *Onygenopsis diplocystis* (B. & Br.).

91.—Sclerocystis coremioides B. & Br.

In the Annals of Botany, Vol. 22, p. 116, I published a re-description of *Sclerocystis coremioides*, and stated that it was

merely a sterile sclerotium, basing that opinion upon the herbarium specimens at Peradeniya, and numerous fresh collections of what appeared to be the same species. Recently von Höhnel has pointed out that the co-type at Kew is not a sterile sclerotium, but is identical with *Sphœrocreas javanicum* v. Höhnel, and *Xenomyces ochraceus* Ces., and co-generic with *Ackermannia* Pat. A re-examination of the Peradeniya specimens has confirmed von Höhnel's identification. Apparently the gathering contained at least one sterile sclerotium, and that chanced to be examined on the previous occasion. The remainder, though similar in size, appearance, and habit, prove on microscopic examination to be identical with the Kew specimens.

92.—Helicoma binale B. & C.

This species, although assigned to Berkeley and Curtis, was published in the Fungi of Ceylon by Berkeley and Broome. It was said to occur " with *Reticularia fuliginosa* No. 247." *Reticularia fuliginosa* was attributed to Berkeley and Broome, and was said to grow on the leaves of some palm. Unfortunately the type specimen of *Reticularia fuliginosa* appears to have been lost; it is not in the Kew or British Museum Herbarium; and Lister (Mon., p. 161) stated that he did not meet with it in the herbaria of Paris, Leyden, Strasburg, &c. It was hoped to find it under *Helicoma binale*, but the type specimens of the latter at Kew are all from South Carolina, on Liquidambar, Curtis, No. 1775, and the British Museum specimens are from the same locality. This Curtis's number, however, provided the type of *Helicoma Berkeleii* Curt. (Grevillea, Vol. III., p. 106), to the description of which Berkeley added the note; " These were sent out as *Helicoma binale* and its variety *apertum*, but were published by Curtis under the above name." Apparently Berkeley intended to convey the idea that the two names referred to the same species, a fact which may also be surmised from the reference of *Helicoma binale* to Berk. and Curtis. But the descriptions are so brief that, in the absence of the Ceylon specimen, no comparison can be made.

93.—Hypomyces chrysostomus B. & Br.

Central Province, Dec., 1868, parasitic upon *Thelephora dendroidea*. Also Peradeniya, 1910, on the same host; and Hakgala, 1910, on a *Polystictus*.

Subiculum white, feathery; conidiophores of the *Verticillium* type; conidia, elliptic or globose, hyaline, continuous, smooth, 11–14 × 7–11 μ.

Perithecia clustered, hyaline at first, then amber, conical, up to 0·25 mm. high, and 0·2 mm. diameter. Asci cylindric, 110–120 × 6–7 μ, eight-spored, spores uniseriate. Spores narrow-oval, sometimes slightly cymbiform, one-septate, not constricted, verrucose, with coarse warts, 17–24 × 5–6 μ, with apparently a solid tip, about 3 μ long, at each end.

94.—Hypomyces chromaticus B. & Br.

"Apparently on some decayed *Stereum*. Jan., 1869."—Thwaites. On a *Polystictus*, Hakgala, May, 1910.

Subiculum at first white, then bright yellow, finally orange. Conidia, oblong-oval, hyaline, one-septate, straight or slightly curved, 14–20 × 5–6 μ.

Perithecia generally crowded, sunk in the subiculum, hyaline at first, orange when dry, 0·25 diameter, spherical, with a rather darker cylindric ostiolum about 120 μ high. Asci cylindric, 130–140 × 5–6 μ, eight-spored, spores uniseriate. Spores spindle-shaped, one-septate, constricted at the septum, hyaline, verrucose, usually apiculate at both ends, 13–17 × 4–5 μ.

95.—Hypomyces pæonius B. & Br.

On *Polypori*, Thwaites. On a *Polyporus*, Hakgala, May, 1907. On *Hirneola hispidula*, Peradeniya, 1910.

Conidiiferous subiculum white; then collapsing and forming a thin felt which varies in colour from pink to purple-red. In an extensive cultivation of this species on *Hirneola* for several months, the mycelium became red when on the upper surface, *i.e.*, exposed to the light, but ochraceous when on the under surface of the *Hirneola*. Conidiophore of the *Verticillium* type; conidia narrow-oval or clavate, usually one-septate, sometimes two-septate, hyaline, smooth, with a large blunt apiculus, 15–28 × 5–6 μ.

Perithecia semi-immersed, deep red, globose, almost smooth, up to 0·25 mm. diameter, with a papillæform or cylindric ostiolum, 0·05 mm. high. Asci cylindric, almost linear, 140–175 × 6–7 μ, apex truncate, spores uniseriate. Spores narrow-oval, hyaline, one-septate, scarcely constricted, strongly verrucose, 25–30 × 5–7 μ, with an apparently solid tip, sometimes curved, 3–5 μ long; some spores are only 19 × 6, obtuse, with the tip scarcely apparent.

96.—Ophionectria trichospora (B. & Br.) Sacc.

Nectria trichospora B. & Br., Jour. Linn. Soc., XIV., p. 115.

Ophionectria trichospora (B. & Br.) Sacc., Michelia, I., p. 323.

Perithecia scattered or in small clusters on a thin, radiating, reddish-brown or whitish byssoid stroma, blood red, 0·25 mm. diameter, 0·4 mm. high, ovoid, apex subtruncate, rugose, ostiolum minute, scarcely evident. Asci 200–250 × 20–25 μ, cylindric, eight-spored. Spores 180–240 × 6–8 μ, pluri-septate, not constricted, vermiform, either of uniform diameter or tapering somewhat to either end, ends rounded.

This clearly belongs to the genus *Tubeufia* Penz. and Sacc., but as it is the type species of the genus *Ophionectria*, *Tubeufia* would appear to be superfluous.

97.—Hypocrea lenta (Tode) B. & Br.

Hypocrea lenta Fr. in B. & Br., Fungi of Ceylon, No. 992.

A Ceylon *Hypocrea* was listed by Berkeley and Broome in the Fungi of Ceylon as *Hypocrea lenta* Fr. In Ellis and Everhart, North American Pyrenomycetes, p. 78, there appears *Hypocrea lenta* (Tode), with the synonym *Hypocrea lenta* B. & Br., Fungi of Ceylon, No. 992; Ellis and Everhart stated that they had only one specimen, which was obtained from California. Finally, in Die Hypocreaceen von Rio Grande do Sul (Annales Mycologici, IX., p. 59), Theissen records *Hypocrea Schweinitzii* (Fr.) E. & E., and cites among the synonyms *Hypocrea lenta* (Tode) B. & Br., Ceylon Fungi, p. 112. But *Hypocrea Schweinitzii* is brown, then black, white internally, with hyaline spores, while the Ceylon species (type and fresh specimens examined) is dark green, flesh-

coloured, or sometimes with a purple tinge internally, with yellowish-green spores. It is evident therefore that all this synonymy is incorrect, and that while *Sphæria lenta* Tode may perhaps be the same as *Hypocrea Schweinitzii* (Fr.) E. & E., the latter is certainly not the same as the "*Hypocrea lenta* Fr." of Berkeley and Broome. What the latter really is has not been determined; it appears to be undescribed. But it seems scarcely worth while to institute new species of *Hypocrea* while there exist so many doubtful descriptions of tropical species with hyaline spores most probably based on immature specimens.

98.—Ustulina zonata Lev.

This species was originally recorded from Java on a dead palm stem. The specimens were apparently immature, since no spore measurements have been made on the type specimen; and hence all recent determinations of the species are based on macroscopic characters only. It was collected again in Java by Penzig and still more recently by von Höhnel. Von Höhnel states that it has not been found elsewhere, but it has for some years been well known as the cause of root disease of several plants in Ceylon. Thwaites sent numerous specimens to Berkeley, who referred them all to *Ustulina vulgaris* Tul. Whether it is really distinct from that species is a matter of doubt; but there seems no doubt that the various recorded collections of *Ustulina vulgaris* from South America are the same as what is known in the East as *Ustulina zonata*.

In Ceylon it attacks the roots of tea, *Albizzia moluccana*, *Citrus* sp., *Cassia nodosa*, and *Lafœnsia Vandelliana*. In the case of tea, it does not attack the roots directly, but only through the agency of a neighbouring tree stump, usually *Grevillea*. *Grevillea robusta* is planted among tea as a wind-break or for green manuring; when these trees are cut down *Ustulina* develops upon the stump and spreads along the roots to the roots of the surrounding tea bushes. On the other plants named, however, the attack is direct. *Ustulina zonata* is commonly found on dead coconut palms, but only, so far as has been ascertained, as a saprophyte.

During investigations into the above-mentioned root disease, numbers of examples of *Ustulina* have been grown in the laboratory, and their development carefully watched. Because of its polymorphic character, it was intended to write a special account of this species with illustrations of its various forms, but as the prospect of doing that becomes yearly more remote, the following note must suffice.

The mycelium of the fungus runs between the wood and the cortex in white fan-shaped patches which often acquire a black edge. When about to produce the fructification it bursts through the cortex, forming a white pustule only two or three millimetres in diameter. Its subsequent growth varies, probably according to external conditions.

In producing the form which is most widely different from *Ustulina vulgaris*, the white hyphæ spread out over the surface of the host and form a thin, resupinate, more or less circular plate, attached only at the centre. It is this form in which the zones, which represent stoppages in growth, are most clearly developed. This occurs on tea, and is the commonest form on coconut. I have observed plates, 9·5 cm. long and 4 cm. broad, only 3 mm. thick in the centre.

In other cases, the hyphæ on emerging from the cortex grow out in an upright column, which expands into a flat-topped turbinate structure, sporiferous on its upper surface only. I have measured such, 1·5 cm. high and 1 cm. diameter across the top. These have the appearance of a *Poronia*, or, when several such structures arise close together, of *Kretzschmeria*. But frequently, when several arise near one another, the discs fuse together, so that the ultimate production is a flat plate supported at several points; or when the fusion is incomplete the appearance is that of Möller's *Hypoxylon symphyton*; the latter exactly resembles, macroscopically, some forms of our *Ustulina*, but its spores are much smaller.

Finally, there is a form which is indistinguishable from the European species. This is specially found when the fructification develops on the host plant at the collar and on the surrounding soil. In such situations the plates are curved and convoluted, fused to each other in all manner of ways, and forming irregular crusts, sometimes a foot or more in breadth.

When first developed the fructification is soft and pure white, and bears hyaline conidia, 6–8 × 2–3 μ, narrow-oval or slightly clavate, on close-packed, erect, parallel, simple basidia. It then becomes greenish owing to the development of the hard crust beneath the conidial layer. In sheltered situations the mature stroma may remain permanently white, owing to the persistence of the remains of the conidial layer, but in general it becomes violet-gray, or purple-gray, dotted with black ostiola. Old weathered specimens are black. The perithecia are globose, about 1 mm. diameter, and distant; and the ostiola scarcely project. The asci are cylindric, long-stalked, about 250 × 10 μ, eight-spored; the apex turns blue with iodine. There are numerous filiform paraphyses. The spores are opaque, black-brown, cymbiform, ends obtuse; measurements on different collections gave 30–38 × 10–13 μ, 34–36 × 10 μ, 30–38 × 9–10 μ. Penzig and Saccardo give the spores of the Java species 33–36 × 10–12 μ, while von Höhnel states that in his specimens they were 45–48 × 8–8·5 μ.

Compared with English specimens collected in Norfolk, the Ceylon species differs in colour, and is usually thinner; its ostiola are less prominent; its perithecia are smaller and more globose; and its spores are, on the average, broader. But the differences are not great. Biologically the Ceylon species appears to differ in its parasitic habit, though information regarding the European species is wanting on that point.

The Ceylon species appears to agree fairly well with von Höhnel's re-description of *Ustulina zonata* Lév., except in the size of the spores. But as that author does not consider the difference between his measurements and those of Penzig and Saccardo important, no stress need be laid on that point.

But von Höhnel found with his specimens a *Graphium*, which he regards as the conidial stage. He states that it resembled a dwarf *Thelephora*, and grew either on the upper or under side of the *Ustulina*. The synnemata are brittle, dark red-brown below, violet-brown above, and reddish-white at the obtuse apex. They are nodular, bent, simple or slightly branched, up to 3 mm. long and 200 to 300 μ broad. At the apex they bear a white head, 200 to 300 μ broad, of

hyaline, elliptic conidia, 5–6 × 3 μ. The conidia are borne singly on the tips of the hyphæ, not in chains.

According to von Höhnel's account, *Ustulina zonata* differs completely from *Ustulina vulgaris* in its conidial stage. This is completely at variance with the experience of numerous cultivations of the Ceylon species, and if it is correct the latter is evidently not *Ustulina zonata*. But in view of the close resemblance of the Ceylon and Javan forms in other respects, it would seem more probable that the *Graphium* is a parasite on the *Ustulina*, not a conidial stage of it. It may be pointed out that one would not expect to obtain the conidial and ascigerous stages of *Ustulina* on the same stroma at the same time.

99.—Otthia lignyodes (B. & Br.) Sacc.

Sphæria (*Cæspitosæ*) *lignyodes* B. & Br., Journ. Linn. Soc., XIV., p. 128.

Perithecia superficial, scattered, or crowded in large groups, covering several centimetres, on a thin stroma, clavate, up to 2 mm. high and 0·8 mm. diameter, fleshy, black, minutely roughened, ostiolum not elevated. The lower half of the " perithecium " forms a solid " parenchymatous " stalk ; the cavity in the upper half is oval, about 0·8 × 0·5 mm., with a wall about 0·1 mm. thick. Asci clavate, apex truncate, pedicel long and tapering, sporiferous part 80–90 × 12–16 μ, eight-spored : spores at first obliquely uniseriate, then biseriate above, uniseriate below. Paraphyses numerous, filiform. Spores varying from narrow-oval to subcymbiform and slightly curved, ends rounded, at first greenish hyaline and three-guttulate, finally fuscous and one- to three-septate. The immature, or just mature, perithecia become cup-shaped when drying ; the perithecia which have extruded their spores do not collapse.

On dead wood, Peradeniya, January, 1912.

100.—Fracchiæa brevibarbata (B. & C.) Sacc.

In Grevillea, XX., p. 113, Cooke states that *Fracchiæa brevibarbata* (B. & C.) Sacc. " was found on *Acer rubrum*, in South Carolina, on bark in Ceylon, and *Rhus copallina*, Santee Canal, S. Carolina." In response to my inquiry the Kew

authorities inform me that under *Fracchiæa brevibarbata* at Kew there is a Ceylon specimen labelled " *Sphæria Broomeiana* Berk. Ceylon, G. H. K. T., Sept. 10, 1850." The latter should be the type of *Coronophora Broomeiana* (Berk.). Evidently Cooke considered *Coronophora Broomeiana* to be identical with *Fr. brevibarbata*, though he did not employ the earlier name, and in his Synopsis Pyrenomycetum he included the latter under *Fracchiæa* and the former under *Coronophora*.

Fracchiæa brevibarbata has been described and figured by Berlese (Icones Fungorum, III., p. 27, Pl. XXXV., Fig. 2) from a specimen supplied by Cooke. It is evidently quite distinct from *Fracchiæa hystricula*, which is the only *Fracchiæa* re-discovered in Ceylon up to the present. But it is difficult to understand from the figure and description how Berkeley could style it " minutissime tomentosa," and give it the name *brevibarbata*. In view of the apparent confusion of Ceylon and American species, it would be interesting to determine whether the two are really identical, and which of them is represented by Berlese's figure.

101.—Fracchiæa hystricula (B. & Br.) Petch.

Sphæria (*byssisedæ*) *hystricula* B. & Br., Jour. Linn. Soc., XIV., p. 125.

Rosellinia hystricula (B. & Br.) Sacc., Sylloge Fungorum, I., p. 274.

Chætosphæria hystricula (B. & Br.) Cooke, Grevillea, XV., p. 124.

Superficial : perithecia scattered or crowded, on a feebly-developed, byssoid stroma, 0·5 mm. diameter, globose, black, wall membranous, collapsing when old, clothed with rigid hairs, 140–260 μ long, 13 μ diameter, black, dark brown and opaque when mounted, slightly inflated at the base, tapering rather abruptly at the apex. Asci broadly clavate, with a long thin pedicel, 90–130 × 12–14 μ, polysporous, soon diffluent. No paraphyses. Spores hyaline, narrow-oval, continuous, 2–3 guttulate, curved in one aspect, 8–11 × 2–3 μ.

On dead *Hevea*, Gampola, Nov., 1909 ; Bentota, Jan., 1912.

102.—Phyllachora Pongamiæ (B. & Br.) Petch.

Rhytisma Pongamiæ B. & Br., Jour. Linn. Soc., XIV., p. 130.

Cryptomyces Pongamiæ (B. & Br.) Sacc., Sylloge Fungorum, VIII., p. 708.

Stromata black, embedded in the leaf and visible on both sides, up to 1 cm. diameter, irregularly circular, shining, covered with minute conical ostiola on the under surface of the leaf. Loculi 150–220 μ diameter. Paraphyses numerous, linear, shorter than the asci. Asci cylindric or clavate, 60–90 × 8–18 μ, eight-spored. Spores oval, hyaline, continuous, 12–16 × 5–8 μ.

The asci are very variable. Raciborski (Parasitische Algen und Pilze Java's, pt. III., p. 18) gives asci 80–94 × 18 μ, spores 14 × 8–9 μ. Fresh specimens collected at Peradeniya showed cylindric asci 60 × 8 μ. The co-type in Herb. Peradeniya has clavate asci 70 × 10 μ, with spores obliquely uniseriate below and biseriate above, and inflated elliptic asci, 90 × 18, spores all obliquely uniseriate, in the same stroma.

On leaves of *Pongamia glabra* Vent., Peradeniya, &c.

In Fungi Indiæ Orientalis, pt. III. (Ann. Myc., IX., p. 376), H. and P. Sydow and E. J. Butler list this species, with a figure, under the name *Cryptomyces Pongamiæ*. It appears to me to be an indisputable *Phyllachora*.

103.—Diatrype russodes B. & Br.

Diatrype russodes B. & Br., Jour. Linn. Soc., XIV., p. 123.

Stromata erumpent, pulvinate, circular or oval, up to 4 mm. diameter, crowded, black, somewhat soft, rough with projecting cylindric ostiola, up to 0·3 mm. high and 0·2 mm. diameter. Asci clavate with a long tapering pedicel, eight-spored, 44–60 × 8 μ; spores uniseriate below, biseriate above. Spores greenish hyaline, cylindric, slightly curved, 8–10 × 3 μ.

On dead twigs, Peradeniya, Dec., 1911. On bark (Thwaites).

104.—Herpotrichia cirrhostoma (B. & Br.) Petch.

Sphæria (*Villosæ*) *cirrhostoma* B. & Br., Jour. Linn. Soc., XIV., p. 126.

Lasiosphæria cirrhostoma (B. & Br.) Sacc., Sylloge Fungorum, II., p. 201.

Leptospora cirrhostoma (B. & Br.) Cooke, Grevillea, XV., p. 125.

Perithecia superficial, gregarious, about 0·5 mm. diameter, black, clothed (except on the disc) with lax, radiating, simple, black, or black-brown septate hyphæ up to 2 mm. long and 4 μ diameter, crowned by a naked disc, about 0·2 mm. diameter, which is orange in the centre and pale yellow towards the margin ; peritheeial wall leathery, not carbonaceous ; ostiolum depressed. Asci clavate, eight-spored, 110–150 × 14–15 μ, spores biseriate above, uniseriate below. Paraphyses numerous, filiform. Spores fusoid, slightly curved, greenish hyaline with hyaline acute tips about 4 μ long, at first one-septate, constricted at the septum, and inflated on one or both sides of it, ultimately 3–4 septate, 32–42 × 7 μ. In the available material, *i.e.*, the herbarium specimens collected by Thwaites, and others recently collected at Peradeniya, all the mature spores have one septum, and the majority show indications of two or three additional septa, but completely three- or four-septate spores are rare.

Berkeley and Broome cite, as Thwaites's collection numbers, 171 and 1073. This does not mean that Thwaites sent two collections, but that 1073 was part of 171, separated by Berkeley and Broome. They add : " In No. 171 some of the hairs are lancet-shaped," and " in the same group are specimens externally just the same, but with very small hyaline very strongly curved sporidia. Apparently another form of fructification of the same species." They appear to have forgotten that they had already described this form, with lancet-shaped hairs, and curved sporidia, as *Sphæria hystricula* (Thwaites 1074, 171 in part).

105.—Berkelella stilbigera (B. & Br.) Sacc.

Stilbum tomentosum Schrad.

This species was described by Berkeley and Broome under the name *Hypomyces stilbiger* B. & Br. (Jour. Linn. Soc., XIV., p. 113) as follows :—

" Peritheciis obovatis acutis ; ascis elongatis, membrana interiore capitata ; sporidiis fusiformibus multiseptatis, coni-

diiferis stilbiformibus (no. 83 bis). *On Trichia.* Sporidia ·006 long, ·0005 wide ; conidia ·0003–·0004 long. It is very interesting to ascertain that *Stilbum tomentosum* Schrad. is merely a conidiophore of a *Hyphomyces* (*sic*) parasitic on *Trichiæ*." The measurements are in inches. The *Trichia* (Thwaites 83) is *Hemitrichia serpula* Rost.

Saccardo (Sylloge Fungorum, II., p. 475) placed this species in a subgenus of *Hypomyces*, which he named *Berkelella*. Subsequently (Sylloge, IX., p. 989) he created a new genus *Berkelella*, in which he placed *Hypomyces caledonicus* Pat., which has four-septate spores, and *Hypomyces stilbiger* B. & Br. The genus is characterized as " Perithecia *Hypomycetis*, sporidia fusoidea vel oblonga 3-pluriseptata, subhyalina." This is wider than the subgenus *Berkelella*, which had simply " sporidiis pluriseptatis."

Berkeley's note appears to have been overlooked. It is clear that he supposed that the conidial stage of *Hypomyces stilbiger* was identical with *Stilbum tomentosum* Schrad., or in other words that he had succeeded in finding the ascigerous stage of the latter. Whether that is true or not obviously depends upon whether the *Stilbum* parasitic on *Trichia* in Ceylon is identical with that parasitic on *Trichia* in Europe.

In the Transactions of the British Mycological Society for 1902 (pp. 25–26) Miss A. L. Smith has traced the history of the name *Stilbum tomentosum*, and has shown that in all the descriptions the spores are said to be globose. Specimens from Hampshire (England) and Devonshire (England) were found to have globose spores, but a specimen from Egham in Surrey (England), in all other respects identical with *Stilbum tomentosum*, had oval spores up to 5×2 μ. On examining the specimens of *Stilbum tomentosum* in the Herbarium of the British Museum, Miss Smith found a specimen from Ceylon in the Broome collection, the spores of which had been drawn and measured by Broome ; they are figured as oval in form and 5 μ long. (It may be noted here that this does not agree with the measurements published by Berkeley and Broome.) Miss Smith considers that the difference between the spores of the two kinds of *Stilbum* amounts almost to a specific distinction, but that the plants are otherwise so much alike

that it seems better to distinguish the second as a variety. Accordingly she has named the oval-spored form, var. *ovalisporum*.

The Stilbum stage of *Hypomyces stilbiger*, parasitic on *Trichia*, is very common in the up-country districts of Ceylon. It occurs on *Trichia varia*, *Trichia affinis*, *Hemitrichia serpula*, &c., but is especially abundant on *Trichia botrytis*. Whole sheets of the latter may be found, every head bearing up to half a dozen specimens of the *Stilbum*. The perithecial stage is rarer, but I have found it on *Trichia botrytis* and *T. affinis*. Berkeley and Broome's specimen in the Peradeniya Herbarium is on *Hemitrichia serpula*. The *Stilbum* stage has been found at Peradeniya on *Perichæna depressa*.

The *Stilbum* is white, erect, up to 0·75 mm. high. The stalk is 30–40 μ diameter, beset with rounded processes : it expands above into a globose head, 120–160 μ diameter, which, when the spores are all removed, exhibits a globose core 70–90 μ diameter. The stalk is composed of parallel hyphæ, and either arises direct from the sporangium of the *Trichia* or is furnished with a slight white stroma at the base. The conidia are minute, oval, and hyaline, and measure 1·5–2 × ·75 μ. Another measurement gave 1·5–3 × ·75–1 μ.

The perithecia are scattered, superficial, flask-shaped, about 0·3 mm. high and 0·2 mm. diameter below, amber coloured, translucent, clothed below with white hyphæ which bind it to the substratum, but glabrous above. The perithecial wall is thin and subtransparent. The asci are cylindric, tapering below, 180–200 μ long and 5–7 μ diameter : the apex is rounded and thickened, with a central pore. There are no paraphyses. The spores are at first eight in number, and about 160 μ long : *they divide within the ascus into cuboid part-spores which round off and become spherical, greenish hyaline, 1–1·5 μ diameter.*

Broome's measurement of the conidia, according to the inscription on his specimen in the British Museum, was 5 μ. But the measurement published by Berkeley and Broome in the " Fungi of Ceylon " was 7·5–10 μ, and it is usually supposed that Broome was responsible for the microscopic measurements published by the joint authors. Examination

of the type specimen of *Hypomyces stilbiger* in the Peradeniya Herbarium shows that it does bear conidia which reach 10 μ or more, but that these are not the spores of the *Stilbum*. The *Stilbum* is parasitized by a *Cylindrocephalum*; this fungus consists of a few hyaline, septate hyphæ, about 3 μ diameter, which twine round the *Stilbum* stalk and head, and produce solitary oval heads up to 13 × 7 μ, each containing up to eight conidia in a parallel bundle; these conidia are cylindric, hyaline, and when mature measure 10–12 × 2 μ, but immature conidia may be only 4–5 μ long.

This may be identical with *Cylindrocephalum stellatum* (Harz) Sacc., recorded as parasitic upon *Stilbum bulbosum* and *Stilbum vulgare*, but the spores of that species are said to be only 5 μ long. It is evident from Broome's measurements that he measured the spores of the *Cylindrocephalum*, an error which may easily be made by any one who is not aware of the possible presence of that species. After careful examination of specimens of the Ceylon *Stilbum* to make sure of the absence of *Cylindrocephalum*, I have found that the *Stilbum* spores are really oval, but measure 1·5–2 × 0·75 μ. In that respect it differs from *Stilbum tomentosum* Schrad.

Since Berkeley and Broome describe the ascospores as multiseptate, it is evident that their specimens were immature. Indeed, it is somewhat a difficult matter to find ripe perithecia, though unripe specimens are fairly common. But they gave a figure (Jour. Linn. Soc., XIV., tab. 6, fig. 29 c) which shows an ascospore partly broken up into subglobose spores. The co-type in the Peradeniya Herbarium is immature. When mature, the spores are not multiseptate, but divided into innumerable part-spores.

Hypomyces stilbiger B. & Br. was the only species of the subgenus *Berkelella*. Saccardo, in instituting *Berkelella* as a genus, (1) refers to its former publication as a subgenus, (2) describes *Berkelella caledonica* (Pat.) Sacc., and (3) adds "ad hoc genus spectat quoque *Berk. stilbigera* (B. & Br.)." But these two species are generically distinct. Under such circumstances, what is the type species of the genus *Berkelella?* Are we to amend *Berkelella* to fit *Hypomyces stilbiger*, and so exclude *Berkelella caledonica*, which has four-septate

spores, and *Berkelella stromaticola* (P. Henn) v. Höhnel, which has three-septate spores, or are we to retain *Berkelella* for these last-named species, and institute a new genus for *Hypomyces stilbiger*? It would appear that, in spite of the prior subgeneric application, Saccardo's order of publication leaves no option, and that we must accept *Berkelella* as at present defined, with the type species *Berk. caledonica*, thus excluding *Berkelella stilbigera*. For the latter species I would propose a new genus *Byssostilbe*—peritheeia *Hypomycetis*; sporidia filiformia, multiseptata, in articulos globosos dilabentia; conidiophoræ Stilbiformes. *Chilostilbe* Penz. and Sacc. (Malpigia, XI., p. 508) differs in having the asci polysporous initially.

In "Icones Fungorum Javanicorum," tab. XXXIII., fig. 4, p. 48, Penzig and Saccardo described *Ophionectria* (*Ophiostilbe*) *Trichiæ*, which was discovered in Java, parasitic on *Trichia verrucosa* Berk. Their specimens were evidently immature, and in all probability had been preserved in alcohol as so many of that collection were; when allowance is made for those points, it is, I think, clear that their species is identical with *Hypomyces stilbiger* B. & Br. They describe the peritheeia as parasitic, superficial, globosoconoid, whitish, rather villous, 130–140 μ diameter, with a rather long papillate ostiolum: asci cylindric, shortly stalked, apex rounded, 70–80 × 4–4·5 μ, eight-spored; no paraphyses; spores filiform, pluriseptate, 60–65 × 0·7–1 μ hyaline. The conidiophore is said to resemble *Stilbum tomentosum* Schrad.: its stalk is cylindric, "exquisite papilloso-asperulo." 270–300 × 30–35 μ, whitish; head subglobose, 60–65 μ diameter, conidia not seen. They state that this species probably constitutes a new genus, which stands in the same relation to *Ophionectria* as *Sphærostilbe* to *Nectria*, and they suggest the name *Ophiostilbe* for it. They did not, however, make use of the latter name except as a subgeneric distinction. Unfortunately, the spores are not filiform when mature, and therefore it is impossible to accept Penzig and Saccardo's suggestion; for the prefix *Ophio* is usually reserved for the names of genera in which the spores are filiform. It may, however, be admitted that very little is known about the ultimate condition of the

spores of most of the species of *Ophionectria*, and it is most probable that many of the species included in that genus have spores similar to those of *Hypomyces stilbiger* B. & Br. Still, that is a reason for splitting the genus *Ophionectria*, rather than for perpetuating the error by the name *Ophiostilbe*. The synonymy of the species is as follows :—

Byssostilbe stilbigera = *Hypomyces stilbiger* B. & Br.
= *Berkelella stilbigera* (B. & Br.) Sacc.
= *Ophionectria Trichiæ* Penz. & Sacc.

It would appear that the conidiophore of *Byssostilbe stilbigera*, which has always been recorded from the Tropics as *Stilbum tomentosum* Schrad., is in reality quite a different species, characterized by its minute oval spores, but the solution of that question would rest on more certain evidence if a perithecial stage of *Stilbum tomentosum* could be found in temperate climates. Whether the Egham specimen recorded by Miss A. L. Smith is another species or variety, or owes its larger spores to the presence of *Cylindrocephalum*, must be decided by a re-examination of it.

106.—Thread Blight (Stilbum nanum Massee).

" Thread Blight " is the name applied to a white mycelium which runs in well-defined strands along living branches and leaves, often at a considerable height from the ground. It is probable that several species of fungi produce such mycelium, indeed such would be expected from the differences in habit exhibited by different examples, but up to the present only two names have been allotted to the tropical forms. In one form, or set of species, the mycelium is certainly parasitic upon the branches and leaves over which it runs. In another group the mycelium originates in a dead stub or " canker," and the spreading strands do not appear to cause any injury to the bark over which they run ; *Hirneola polytricha* belongs to this group. Another type, which should also be classed here, forms a white cushion which binds together the stems of jungle shrubs where they happen to touch one another.

A species which is parasitic upon nutmeg in Ceylon has been under observation for several years, and it is hoped to publish

a full account of it shortly. Its fructification consists of small sessile pilei, which appear to have been described as a *Cyphella* by Berkeley and Broome. It is closely related to *Marasmius scandens* Massee, which grows on cacao in West Africa, but in the latter the white strands are rather thicker. Unfortunately, specimens sent to me from West Africa by Mr. W. S. D. Tudhope do not bear any fructification, and I was not able to find the type specimen of *Marasmius scandens* in the Kew Herbarium. The Ceylon species appears to be identical with that recorded as parasitic upon tea in India, under the name of *Stilbum nanum*. But an examination of the type specimens of *Stilbum nanum* shows that the white thread blight has no connection with the *Stilbum*: the twigs which bear the latter show no Thread Blight, and, except that both are on tea, there is no reason why they should have been thought to be stages of the same fungus.

Stilbum nanum is a small red or pinkish *Stilbum* which is common on dead twigs of tea, Hevea, &c. It appears to be identical with the later *Stilbum* (*Stilbella*) *Heveæ* Zimm. It was described as "flavidum," but to any one who knows the changes which tropical fungi undergo in drying, it is evident that it was originally red. As far as is known, it is purely saprophytic.

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